

1.	Title of the course	Data Curation and Visualization
2.	Course number	ID511M
3.	Structure of credits (L-T-P-C)	2-0-3-4
4.	New course/modification to	New
5.	To be offered by	Mathematics and Statistics
6.	Proposed by	Panchatcharam M
7.	Prerequisite	None
8.	Course Objective(s): To discuss fundamental principles and practices of data curation, including data acquisition, cleaning, transformation, integration, governance, and lifecycle management for reliable and high-quality data analysis. To develop the ability to effectively visualize and communicate data insights, using statistical and interactive visualization techniques, programming tools, and dashboards for exploratory analysis and decision-making.	
9.	Course Content: Overview of data curation; Data acquisition and collection, data lifecycle management, governance and compliance; Types of data: quantitative, categorical, temporal, time-series and multi-modal; Data cleaning: data quality issues, handling missing values, outlier detection and treatment, and resolving data inconsistencies; Data wrangling: data summarization, reshaping and transformation; Multi-modal data integration; Principles of data visualization and grammar of graphics; Univariate, bivariate and multivariate visualizations; Statistical visualizations including histograms, box plots, scatter plots and heatmaps; Visualization of time-series, geographical and text data; Python visualization libraries: Matplotlib, Seaborn and Plotly; Interactive dashboards using Python and Tableau, including filtering, customization and visual analytics design.	
10.	Textbook(s): 1. Iliinsky N and Steele J, Designing Data Visualizations: Representing Informational Relationships, O'Reilly Media (2011). 2. McKinney W, Python for Data Analysis: Data Wrangling with Pandas, NumPy, and Jupyter, 3rd Edition, O'Reilly Media (2022).	
11.	Reference(s): 1. Knaflig C N, Storytelling with Data: A Data Visualization Guide for Business Professionals, Wiley (2015). 2. Scott M, Interactive Data Visualization for the Web, 2nd Edition, O'Reilly Media (2017). 3. Kieran H, Data Visualization, Princeton University Press (2019). 4. Leland W, The Grammar of Graphics, 2nd Edition, Springer (2005).	